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MINTZ, LEVIN, COHN, FERRIS, GLOVSKY
AND POPEO, P.C.
ONE FINANCIAL CENTER
BOSTON, MA 02111

EXAMINER	
AFREMOVA, VERA	
ART UNIT	**PAPER NUMBER**
1651	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/509,159	FARMER ET AL.	
	Examiner	Art Unit	
	Vera Afremova	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/07/2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-24,34-43 and 49-69* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-24,34-43 and 49-69* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: translation of JP 3-192200

DETAILED ACTION

Claims 14-24, 34-43 and 49-69 as amended (11/07/2005) are pending and under examination.

Claim Rejections - 35 USC § 112

Claims 14-24, 34-43 and 49-69 as amended remain rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The as-filed specification disclosure does not enable one skilled in the art to practice the invention without an undue amount of experimentation.

Factors to be considered in determining whether undue experimentation is required, are summarized in In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988). They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. The factors most relevant to this rejection are the scope of the claim, the amount of direction or guidance provided, the lack of sufficient working examples, the unpredictability in the art and the amount of experimentation required to enable one of skill in the art to practice the claimed invention.

Nature of instant invention is directed to the use of topical compositions with probiotics to control microbial infections.

The breadth of the claims is directed to a method for inhibiting and treating bacterial, yeast, fungal and/or viral infections including vaginal infections by applying topically to skin or mucous membrane a probiotic composition comprising *Bacillus coagulans*. Some claims are further drawn to bacterial, yeast, fungal and/or viral infections including vaginal infections including *Staphylococcus*, *Tichophyton* and *Candida* species.

The as-filed specification only discloses various topical compositions with *Bacillus coagulans* cells as intended to control microbial infections. The specification merely suggests generic doses and/or generic protocols of administration of the probiotic compositions for unidentified generic patients. No experimental data for treating mammals and inhibiting skin or mucous membrane infections of mammals have been disclosed and demonstrated by applicants.

As related to the actual methods for inhibiting and/or treating bacterial, yeast, fungal and/or viral infections including vaginal infections the specification only discloses the ***in vitro*** assays (example 1, pages 24-27) of antimicrobial activity **of one** representative of *Bacillus coagulans* such as strain ATCC 31284 (page 12, line 7) towards infections limited to *Tichophyton* species and *Candida* species. The protocol of *in vitro* assays is based on measuring inhibition zones on agar plates. No animal cells including skin or mucous membrane cells are involved in the *in vitro* assays. Moreover, no animals were used as *in vivo* model systems for inhibiting and/or treating all bacterial, yeast, fungal and/or viral infections including vaginal infections as claimed.

Thus, the specification does not adequately teach how to effectively inhibit all bacterial, yeast, fungal and/or viral infections including vaginal infections because no animal cells or live animals were used. Therefore, the specification does not and cannot adequately teach how to

effectively treat bacterial, yeast, fungal and/or viral infections including vaginal infections because no animal cells and/or no live animals were used to demonstrate inhibition of infections by probiotic compositions with *Bacillus*.

With regard to unpredictability of the claimed method(s) as drawn to generic representatives assigned to the species of *Bacillus coagulans,* it is noted that only one and specific strain ATCC 32184 has been used in the in vitro assays on agar plates as disclosed in the as-fled specification. However, not only various species are different in their manifestation of antimicrobial activity but also even representatives of one species do not inhibit all claimed bacterial, yeast, fungal and/or viral infection including vaginal infections within the scope of the presently claimed invention. For example: the reference by Sytnik (IDS reference; Mikrobiologicheski Zhurnal, 1989, 51, 1:82-87) demonstrates that at least some strain(s) of the claimed *Bacillus coagulans* do not inhibit all clinical *Staphylococcus* infections (see table 3).

With regard to unpredictability of the claimed method(s) as drawn to inhibiting various topical and mucous membrane infections including vaginal infection, Seligman (British Journal of Obstetrics and Gynaecology. October, 1995. Vol. 102, pages 763-764) teaches that the studies of the use of probiotics or of bacilli in the treatment of vaginitis have almost all been limited, uncontrolled and have given variable results (page 763, col. 2, par. 4, lines 1-4). Thus, the state of the art provides no reasonable expectation of success.

Seligman also teaches that the ability of bacteria to adhere to animal epithelial cells is an important factor in colonization of mucous membrane or vagina and that the different species show varying effects (page 763, col. 2, par. 2. lines 1-4). The instant specification does not demonstrate that the claimed *Bacillus coagulans* including only one exemplified ATCC 31284

(that has antimicrobial activity towards *Tichophyton* species and *Candida* species) are capable to adhere to the animal epithelial cells and/or to colonize the animal epithelial cells in competitive exclusion or in interactions with other microbes or infectious agents. Thus, the ability of the claimed *Bacillus* species including one exemplified ATCC 31284 to adhere to animal cells including mucous membrane cells is unpredictable and, therefore, the selection of desirable *Bacillus* species requires undue experimentation.

The claimed doses and/or protocols of administration are generic considerations and they are not supported for the whole breath of instant claims because neither claimed doses nor claimed protocols have been demonstrated in models involving animal cells and/or live animals and because the claimed doses have not been demonstrate as effective for colonization of skin or mucous membrane including vagina. The specification does not teach how to extrapolate data obtained from *in vitro* antimicrobial studies on agar plates as obtained with one strain towards a limited number of infections to the development of effective *in vivo* mammalian including human therapeutic treatment, in order to commensurate in scope with the claimed invention. Therefore, it is not clear that the skilled artisan might predict the efficacy of methods for inhibiting and treating bacterial, yeast, fungal and/or viral infections including vaginal infections by applying topically to skin or mucous membrane probiotic composition with *Bacillus* species. As such, the invention must be considered unpredictable. Thus, in the absence of working examples or detailed guidance in the specification with regard to specific strains, the intended uses for composition comprising probiotics *Bacillus coagulans* are fraught with uncertainties. Without sufficient guidance the methods as claimed are unpredictable and the experimentation left to those skilled in the art is unnecessarily, improperly, extensive and undue.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 14-16, 24, 34-39, 49-50, 55-57, 65-67 as amended remain rejected under 35 U.S.C. 102(b) as being anticipated by US 4,871,539 (Hata et al.) as explained in the prior office action.

Claims are directed to a method for inhibiting or treating bacterial, yeast, fungal and/or viral infections including vaginal infections wherein the method comprises step of applying topically to skin or mucous membrane probiotic composition with a generic representative assigned to the species of *Bacillus coagulans*. Some claims are further drawn to forms of the compositions including liquid and solid.

US 4,871,539 discloses a method of using probiotic composition with *Bacillus* species (example 5 including col. 18, lines 34-37 and tables 4-6) wherein the method comprises step of applying topically to skin or mucous membrane (col. 8, line 52) live bacterial cells (col. 9, line38) of *Bacillus* species A and B that are *Bacillus coagulans* strain 2930 and *Bacillus subtilis* strain 3335 (table 3). Protocol is twice a day for 4 days (col.18, lines 34-37). Topical applications include pubic and vaginal areas (col. 11, lines 1-2 and line 28). Forms of the compositions are liquids (col. 10, lines 3-5) and suppositories (col. 11, line 21). The liquid solutions include sugars. The cited patent teaches that addition of *Bacillus* resulted in extended periods of

beneficial effects (col. 22, line 48) particularly when pathogens were present in the vaginal area (col. 11, lines 3-7).

Thus, the prior art method comprises the same active step and structural elements as the claimed methods. When a claim recites using an old composition or structure and the use is directed to a result or property of that composition or structure then the claim is anticipated. See MPEP 2112.02.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 14-16, 20-22, 24, 34-39, 41-43, 49-50, 55-57, 59-67 as amended remain rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,871,539 (Hata et al.) taken with Gibson et al. (Gastroenterology. 1995. 108: page 975) and JP 3-192200 as explained in the last office action.

Claims 14-16, 24, 34-39, 49-50, 55-57, 65-67 as explained above. Claims 20-22, 41-43 are further drawn to incorporation of FOS into probiotic compositions. Claims 59-64 are further drawn to incorporation of additional bath oils, salts, surfactants into probiotic compositions.

US 4,871,539 is relied upon as explained above. It teaches incorporation of sugars into probiotic compositions for application to mucous membranes but it is lacking disclosure about sugars such as FOS and additional bath oils, salts, surfactants. .

However, Gibson teaches that addition of FOS stimulates probiotic bacteria that come into contact with mucous membrane (abstract).

JP 3-19220 teaches addition of salts and surfactants into detergent compositions with *Bacillus coagulans* and *Bacillus subtilis* cells and/or products (English abstract).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to add the probiotic growth promoting substances including FOS and the additional components including oils, salts, surfactants suitable for topical applications with a reasonable expectation of success in topical delivery of viable and effective probiotic compositions comprising *Bacillus* species. Thus, the claimed invention as a whole was clearly *prima facie* obvious, especially in the absence of evidence to the contrary.

The claimed subject matter fails to patentably distinguish over the state art as represented be the cited references. Therefore, the claims are properly rejected under 35 USC § 103.

Response to Arguments

Applicant's arguments filed 11/07/2005 have been fully considered but they are not persuasive.

With regard to the claim rejection under 35 U.S.C. 112, first paragraph, Applicants argue that one of skill in the art has means to determine the effectiveness of each given bacterial strain and its effective amounts and, thus, selection of a proper probiotic strain including strains of *Bacillus coagulans* would be without undue experimentation. However, the state of the art adequately demonstrates that various bacterial strains including those belonging to the species of *Bacillus coagulans* have different effectiveness, if any, in the in vitro and in vivo systems. In

fact, the reference by Sytnik et al. teaches that none of the 5 tested strains of *Bacillus coagulans* were found to be capable to inhibit *Staphylococcus* infections, for example: see table 3. Therefore, the selection of a proper strain capable to inhibit all claimed infections is considered to require undue experimentation.

Furthermore, the claimed invention is not limited to any specific strain(s) suggested in the applicants' disclosure as argued. Moreover, the list of strains disclosed by applicants is a mere suggestion because only one stain ATCC 31284 has been tested (page 12, line 7) against the claimed infections and because this strain has been used for inhibiting infections only in the *in vitro* assays. Although the claimed amounts for a generic *Bacillus coagulans* are disclosed by applicants in the as-filed specification, one of ordinary practitioner would not be able to use the claimed method because administration of any generic strain in amounts as claimed would still be unnecessary, improper and/or ineffective for inhibiting all infections as claimed.

With regard to the claim rejections under 35USC § 102 and under 35 USC § 103 applicants' main argument is that the method of the cited patent US 4,871,539 (Hata et al.) comprises administration of a mixed bacterial preparation but the presently claimed method is limited to administration of a single bacterial probiotic species (response page 11). Yet, the claimed method is open to incorporation of additional bacterial component(s) into a probiotic composition by the virtue of open language "comprising". Therefore, the cited patent that teaches the use of one *Bacillus coagulans* specific strain No. 2930 (A strain) in a mixture with other bacterial components in a probiotic composition is considered to be a proper prior art reference.

No claims are allowed.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vera Afremova whose telephone number is (571) 272-0914. The examiner can normally be reached from Monday to Friday from 9.30 am to 6.00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached at (571) 272-0926.

The fax phone number for the TC 1600 where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology center 1600, telephone number is (571) 272-1600.

Vera Afremova

AU 1651

January 16, 2006

VERA AFREMOVA

PRIMARY EXAMINER

for 09/509,159

PTO 05-4735

Japanese Kokai Patent Application
No. Hei 3[1991]-192200

PET-CLEANING DETERGENT

Testsuro Watanabe, et al.

UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. JULY 2005
TRANSLATED BY THE MCELROY TRANSLATION COMPANY

JAPANESE PATENT OFFICE
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PET-CLEANING DETERGENT

[Petto yo senzozai]

Inventors: Tetsuro Watanabe, et al.

Applicant: Mitsubishi Materials Corporation

[There are no amendments to this patent.]

Claims /1*

1. A pet-cleaning detergent, characterized by being composed of microorganism groups, enzymes, lactose, glucose, ammonium chloride, surfactants, and water.

2. The pet-cleaning detergent of Claim 1, characterized by the fact that the above-mentioned microorganism group is comprised of several groups of microorganisms of Bacillus, Streptococcus, Rhizopus, Aspergillus, Nitrobacter, Nitrosomonas, and Pseudomonas bacteria.

3. The pet-cleaning detergent of Claim 1, characterized by the fact it contains that enzymes at 1 part by weight or less, lactose at 3-5,000 parts by weight, glucose at 3-5,000 parts by weight, ammonium chloride at 0.5-3,000 parts by weight, surfactants at 10-3,000 parts by weight, and water at 300-6,000,000 parts by weight to said microorganism groups at 10 parts by weight.

Detailed explanation of the invention

Industrial application field

The present invention pertains to a microorganism group pet-cleaning detergent. In other words, the present invention pertains to a microorganism group pet-cleaning detergent that can efficiently remove soil when pets are cleaned.

Prior art and problems to be solved by the invention

Cleaning detergents for cleaning pets such as dogs and cats have already been on the market, and their compositions are mainly comprised of (1) surfactants, aromatics, and pigments, and (2) substances for improving the gloss of hair and skin, and nutrients are further added. There is no composition having microorganisms as its constitutional elements.

Since the compositions are mainly composed of chemically synthesized products, the effects are strong, but there is also a chemical irritation. It is necessary to completely or nearly completely wash them out. During cleaning, usually, pets hate to be washed with water, and if possible, pets are simply cleaned with water or sprayed with water. The development of

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* [Editor's note: Numbers in the right margin represent pagination in the original foreign language text.]

substances with a cleaning or deodorization effect has been in demand. /2

In order to overcome the above problems, the purpose of the present invention is to provide a pet-cleaning detergent that minimizes the cleaning labor, promotes a deodorization effect, and does not have a harmful effect on pets and human beings who handle them. Furthermore, the present invention solves the problems of the conventional pet-cleaning detergents by using microorganisms and enzymes.

Means to solve the problems.

The essence of the present invention is a pet-cleaning detergent composed of microorganism groups, enzymes, lactose, glucose, ammonium chloride, surfactants, and water. The above-mentioned microorganism groups are comprised of several groups of microorganisms of Bacillus, Streptococcus, Rhizopus, Aspergillus, Nitrobacter, Nitrosomonas, and Pseudomonas bacteria. Then, the cleaning detergent is appropriately a mixture of enzymes at 1 part by weight or less, lactose at 3-5,000 parts by weight, glucose at 3-5,000 parts by weight, ammonium chloride at 0.5-3,000 parts by weight, surfactants at 10-3,000 parts by weight, and water at 300-6,000,000 parts by weight to said microorganism group at 10 parts by weight.

According to the present invention, first, in the microorganism group pet-cleaning detergent of the present invention using microorganisms, the composition components are adjusted to be suitable for the conditions of nutrition, growth, and multiplication for specific microorganism mixtures and their growth. The microorganism group pet-cleaning detergent of the present invention is composed of the microorganism group, enzymes, lactose, glucose, ammonium chloride, surfactants, and water.

This cleaning detergent is a mixture of enzymes at 1 part by weight or less, lactose at 3-5,000 parts by weight, glucose at 3-5,000 parts by weight, ammonium chloride at 0.5-3,000 parts by weight, surfactants at 10-3,000 parts by weight, and water at 300-6,000,000 parts by weight to said microorganism groups at 10 parts by weight.

In the pet-cleaning detergent of the present invention, fixed mixed microorganism groups can efficiently clean pets under optimal conditions, and conditions in which soils can be broken down and removed can be arranged.

As the microorganisms included in the cleaning detergent of the present invention, The Bacillus (1) is especially appropriately B. subtilis (IAM (Institute of Applied Microbiology: Applied Microorganism Institute of the University of Tokyo, an abbreviation of useful strain storage facility: hereinafter, similarly shown by this abbreviation) 1168), and in addition to that, B. natto (IFO (Institute for Fermentation Osaka: Fermentation Institute; abbreviation; hereinafter, similarly shown by this abbreviation) 3009), B. coagulans (IAM 1115), and B. macerans (IAM 1243) can also be used.

As the microorganisms of the Streptococcus (2), any microorganisms may be used, and S. faecalis (IAM 1119), S. cremoris (IAM 1150), S. lactis (IFO 12546), etc., can be used.

Also, as the microorganisms of the Rhizopus as a kind of mold, Rhizopus formosaensis (IAM 6250), Rhizopus oryzae (IAM 6006), Rhizopus pseudochinensis (IAM 6042), etc., can be used.

As the microorganisms of the Nitrosomonas (4), Nitrosomonas europaea (IFO 14298), etc,. can be used.

As the microorganisms of the Nitrobacter (5), Nitrobacter agilis (IFO 14297), etc., can be used.

As the microorganisms of the Pseudomonas (6), P. nitroreducens (IFO 12694), /3
P. caryophillis (IFO 12950), and P. stutzeri (IFO 3773) can be used.

Then, as the microorganisms of the Aspergillus (7), A. niger (IFO 4066), A. usami (IFO 6032), etc., can be used.

In the present invention, a microorganism group for decomposing and removing offensive odor sources and fine soil adhered to pets can be provided by introducing these seven groups of microorganisms.

In other words, a) the microorganisms (1)-(7) generally decompose organic substances and organic group decayed substances, or enzymes (amylase, protease, etc.) being generated by them can further decompose organic substances and offensive odor sources in a short time; b) with the combination of the microorganisms of (1), (2), (3), and (7), there is an effect that converts sugar, glucose, lactose, etc., in organic substances into organic acids such as citric acid, and they are adsorbed as organic acids to the surface of pets and neutralize offensive odors; and c) the microorganisms of (4), (5), and (6) have an effect through adhering to the surface of pets and decomposing offensive ammonia odors over the long term. In other words, (4) converts ammonia into NO_2, (5) converts NO_2 to NO_3, and (6) converts NO_3 to N_2 and an ammonia odor into an odorless gas.

The decomposition effect of soils of pets is completed by including glucose at 3-5,000 parts by weight, lactose at 3-5,000 parts by weight, ammonium chloride at 0.5-3,000 parts by weight, surfactants at 10-3,000 parts by weight, enzymes at 1 part by weight or less, and water at 300-6,000,000 parts by weight to these microorganism groups at 10 parts by weight.

The glucose is a carbon group nutritive source for microorganisms and is converted into a substance such as organic acids for neutralizing odors, and if the glucose is less than 3 parts by weight, the growth of microorganisms cannot be effectively promoted. If the glucose is more than 5,000 parts by weight, the number of microorganisms of Aspergillus and Bacillus is increased too much, so that the coexistence with other kinds of microorganisms is impossible.

The lactose is a carbon group nutritive source for microorganisms (1)-(3) and (7), is converted into organic acids such as lactic acid and becomes a base of a mask, neutralization, and aromatic generation of offensive odor sources. If the lactose is less than 3 parts by weight, the growth of microorganisms is not effectively promoted and is appropriate, and if the lactose is more than 5,000 parts by weight, the number of microorganisms of (1)-(3) and (7) is increased too much, so that the coexistence with other kinds of microorganisms is impossible.

The ammonium chloride is a nitrogen group nutritive source for the growth and multiplication of microorganisms and is essential.

If the ammonium chloride is less than 0.5 part by weight, the growth of microorganisms is not effectively promoted and is inappropriate. Also, if the ammonium chloride is more than 3,000 parts by weight, the resolution of organic substances and offensive odor sources is lowered and results in an ammonia odor.

Furthermore, surfactants are added. In addition to the operation and effects of the microorganisms and the enzymes, in the present invention, it is necessary to make these effective components easily permeate and contact with the interface of organic substances or offensive odor sources attached and adsorbed to pets.

As surfactants, there are anionic group, cationic group, and nonionic group, and surfactants with a large permeability is appropriate. For example, alkylallyl, polyether alcohol, sodium/dioctyl sulfosuccinate, etc., are selected, and as practical surfactants being used, potassium alkyl benzene sulfonate, polyoxyethylene (9-10 mol) oleate, [illegible] fatty acid monoglyceride sulfuric ester potassium salt are used alone or in combinations of two or more.

Then, the surfactants are added at 10-3,000 parts by weight to the microorganism group mixture at 10 parts by weight. If the amount is less than 10 parts by weight, they do not assist in the permeation of the effective components, and the desired effects of the present invention cannot obtained. Also, if the amount is more than 3,000 parts by weight, they are harmful to the growth of microorganisms, which is not preferable.

The enzymes decompose organic substance components of soils attached and adsorbed to pets that are causes for offensive odors at an early stage. As the enzymes, amylase, protease, lipase, urease, etc., are used. They are added to reinforce the [enzymes] being generated by microorganisms. Even if the enzymes exceed 1 part by weight to the microorganism groups at 10 parts by weight, the effects are not considerably changed, and the cost is increased. /4

Furthermore, as the water being used, deionized water and distilled water are appropriate, and it is added at 300-6,000,000 parts by weight to the microorganism groups at 10 parts by weight. It is required at an appropriate amount as a medium to dissolve the microorganisms, nutritive sources, etc., and to efficiently generate enzymes and organic acids as effective components. If the water is less than 300 parts by weight, the concentration of microorganisms

and nutritive sources is too high, and a sufficient reaction is impossible. If the water exceeds 6,000,000 parts by weight, the cleaning solution is too dilute, and the concentration of organisms is lowered, so that the effects of the present invention are lowered.

The pet-cleaning detergent of the present invention is produced as a product by weighing the constitutional raw materials in the above-mentioned mixture and stirring them at 30-35°C for 60 h.

Furthermore, the microorganism group pet-cleaning detergent of the present invention can also be used as a cleaning detergent for decorative stones and general detergents [purposes].

Next, the microorganism group pet-cleaning detergent of the present invention is explained with reference to detailed examples, however the present invention is not limited to the following application examples.

Application example

Manufacture of cleaning detergent:

1.20 g B. subtilis (IAM 1168) of Bacillus, 1.00 g S. lactis (IFO 12546) of Streptococcus, 0.55 g R. oryzae (IAM 6006) of Rhizopus, 1.00 g A niger (IFO 4066) of Aspergillus, 0.35 g N. agilis (IFO 14297) of Nitrobacter, 0.45 g N. europaea (IFO 14298) of Nitrosomonas, and 0.45 g Pseudomonas nitroreducens (IFO 12694) of Pseudomonas were weighed, and 0.2 g amylase, 0.2 protease, 0.1 g lipase, 33 g glucose, 23 g lactose, 4.5 g ammonium chloride, 30 g potassium alkyl benzene sulfonate, and 5,000 cc water were uniformly mixed with them and stirred at 35°C for 60 h, so that about 5 L pet-cleaning detergent was obtained.

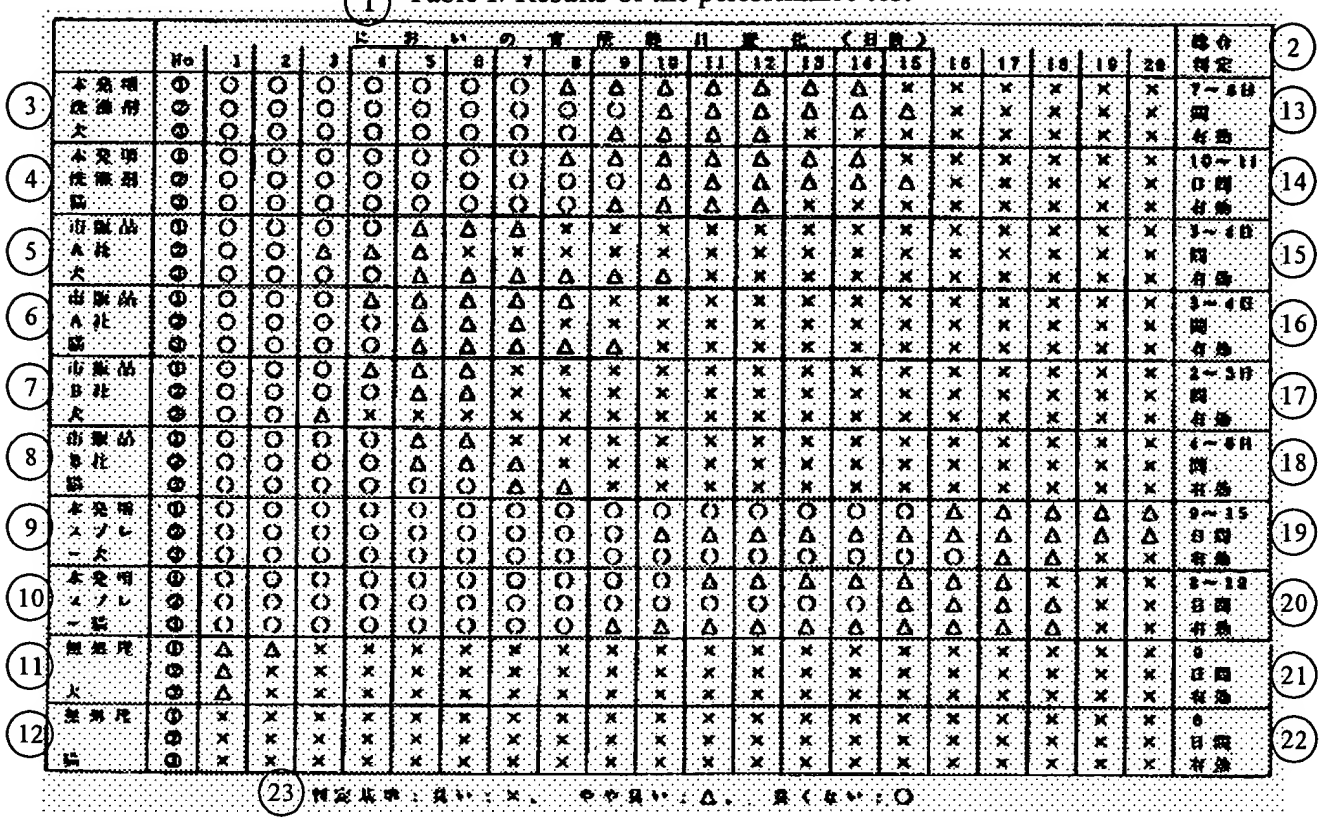
Performance test:

15 dogs and 15 cats being fed as pets were collected, and one product was used for three animals each. 100 mL each of the pet-cleaning detergent of the present invention, A company product on the market, and B company product were dissolved in water and permeated for 5 min into the pets. Then, the pets were cleaned for 2 min in 20 L water tank and held for 20 days, and the generation of odors was compared. As a blank, non-treatment data were sampled.

Furthermore, the cleaning detergent of the present invention was sprayed at 20 mL on the entire surface of 3 dogs and 3 cats and held for 20 days, and the generation of odors was observed.

The results of the performance test are shown in Table 1.

(1) Table I: Results of the performance test



Key:
1 Change of odor functions with day (number of day)
2 Overall decision
3 Cleaning detergent of the present invention, dog
4 Cleaning detergent of the present invention, cat
5 A company product on the market, dog
6 A company product on the market, cat
7 B company product on the market, dog
8 B company product on the market, cat
9 Spray of the present invention, dog
10 Spray of the present invention, cat
11 No treatment, dog
12 No treatment, cat
13 Effective for 7-8 days
14 Effective for 10-11 days
15 Effective for 3-4 days
16 Effective for 3-4 days
17 Effective for 2-3 days
18 Effective for 4-6 days
19 Effective for 9-15 days
20 Effective for 3-10 days
21 Effective for 0 day
22 Effective for 0 day

23 Decision standards:
Good: X, slightly good: Δ, and poor: O

From Table 1, the pet-cleaning detergent of the present invention, offensive odors for the dogs were suppressed for 7-8 days, compared with the products on the market that suppressed the offensive odors for only 2-4 days. Then, for the cats, the product of the present invention suppressed offensive odors for 10-11 days, compared with the products on the market that suppressed the offensive odors for only 4-6 days.

Furthermore, in particular, in the results of the spray treatment without cleaning, the product of the present invention maintained its effects for 9-15 days for dogs and 8-10 days for cats.

Thus, in the decision of the comparison of the simple offensive odor suppression effects, the product of the present invention showed the effect of 2-3 times of the products on the market.

As seen from these results, in the microorganism group pet-cleaning detergent of the present invention, the deodorization effect is remarkable, and a clean soil treatment is possible.

Effect of the invention

Since the microorganism group pet-cleaning detergent of the present invention exerts the following deodorization effect, it is markedly effective as a pet cleaning agent.

In other words, first, the effective substances such as microorganisms, enzymes being generated by the microorganisms, and organic acids and the enzymes being added are assisted by the surfactants, dispersed into all of fine parts of the hair and the skin of the body surface of the pets, decompose or fix substances causing the soiling and offensive odors, and can deodorize them.

Second, instead of the physical action that only cleans and washes out the substances causing soiling and offensive odors, in the present invention, since these offensive odor sources are essentially decomposed and fixed with an immediate effect, the deodorization effect is maintained over the long term.

Third, in the present invention, since some microorganisms which are harmless even when cleaning with water are adsorbed to the body surface of the pets, especially into the hair, the deodorization effect can be exerted over the long term, though it is manifested especially in the spray treatment.

As mentioned above, the pet-cleaning detergent of the present invention can almost completely decompose and fix organic substances being causes for soils and offensive odors attached and adsorbed to pets in a short time, it is very effective as a pet-cleaning detergent. Thus, the present invention is industrially very meaningful.

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